

CLAIMS

What is claimed is:

1. A method for assessing the performance of a hearing aid that includes an implanted hearing aid actuator, comprising:
 - 5 positioning a test device external to a patient having the implanted hearing aid actuator;
 - utilizing said test device to obtain at least one measure of a magnetic field generated by the actuator in response to an electrical signal passing through the actuator; and,
 - 10 employing the at least one magnetic field measure to assess the performance of the actuator.
2. The method of Claim 1 wherein the employing step, includes:
 - 15 comparing the at least one magnetic field measure to a first predetermined range to assess a first performance parameter.
3. The method of Claim 2 comprising:
 1. providing an output indicative of whether the at least one magnetic field measure is within the first predetermined range.
4. The method of Claim 2 wherein the employing step includes:
 - 20 comparing the at least one magnetic field measure to a second predetermined range to assess a second performance parameter, wherein the

second predetermined range is at least partially non-overlapping with the first predetermined range.

5. The method of Claim 4 comprising:

5 providing an output indicative of whether the at least one magnetic field measure is within the second predetermined range.

6. The method of Claim 4 wherein the step of utilizing comprises:

10 providing at least one predetermined test signal for use in generating the electrical signal passing through the actuator.

7. The method of Claim 6 wherein the at least one predetermined test signal has a frequency within a predetermined range of a resonant frequency of the actuator.

15

8. The method of Claim 6 wherein the utilizing step includes:

inductively coupling the at least one test signal between an external transmitter and a subcutaneous coil, wherein the subcutaneous coil provides the electrical signal to the actuator.

20

9. The method of Claim 6 wherein the utilizing step includes:
providing the at least one test signal to an implanted microphone, wherein the implanted microphone provides the electrical signal to the actuator.

10. The method of Claim 7 wherein comparing the at least one magnetic field measure to the first predetermined range to asses the first performance parameter includes:

using a magnetic field measure obtained in corresponding relation to the
5 resonant frequency to determine if the hearing aid is operational.

11. The method of Claim 10 wherein the step of comparing the at least one magnetic field measure to the second predetermined range to asses the second performance parameter includes:

10 using the magnetic field measure obtained in corresponding relation to the resonant frequency to asses an interface between the actuator and a component of the auditory system of the patient.

12. The method of Claim 11 comprising:
15 responsive to determining the interface between the actuator and the component of the auditory system is undesirable, repositioning the actuator to achieve a desirable interface.

13. The method of Claim 12 wherein the repositioning step includes:
20 providing an electrical input to a positioning system to selectively position the actuator relative to the component of the auditory system.

14. The method of Claim 13 wherein the step of providing the electrical input comprises:

providing a wireless signal to the positioning system from a position external to the patient.

5

15. The method of Claim 13 wherein the step of providing the electrical input comprises:

inductively coupling the electrical input to the positioning system.

10 16. The method of Claim 1 wherein the positioning step includes:

obtaining a first measurement of the magnetic field at a first location;

obtaining a second measurement of the magnetic field at a second location;

15 providing an output indicative of the first and second measurements of the magnetic field ; and

using the output to determine a desired position of the test device.

17. The method of Claim 1 wherein the step of utilizing includes:

20 providing a plurality of predetermined test signals for use in generating a corresponding plurality of electrical signals passing through the actuator, wherein the plurality of predetermined test signals includes a corresponding plurality of different frequencies distributed across a predetermined frequency range.

18. The method of Claim 17 wherein the utilizing step includes:

using the test device to obtain a plurality of magnetic field measures corresponding to the plurality of electrical signals passing through the actuator.

5

19. The method of Claim 18 wherein the employing step includes:

identifying a resonant frequency of the actuator using the plurality of magnetic field measures.

20. A device for assessing the performance of a hearing aid that includes an implanted hearing aid actuator, comprising:

a signal generator to output a test signal at a predetermined frequency that generates an electrical signal passing through the implanted hearing aid actuator;

15 a measurement device to measure a magnetic field generated by the implanted hearing aid actuator in response to the electrical signal to generate at least one test measure of the electrical signal; and

20 a signal processing unit to process the reference signal and the at least one test measure to assess at least one performance parameter of the implanted hearing aid.

21. The device of Claim 20 wherein the signal processing unit is configured to compare the at least one test measure to a first predetermined range to assess a first performance parameter.

22. The device of Claim 21 comprising:

a user interface to provide an output from the signal processing unit indicative of whether the at least one magnetic field measure is within the first predetermined range.

5 23. The device of Claim 22 wherein the signal processing unit is configured to compare the at least one test measure to a second predetermined range to assess a second performance parameter, wherein the second predetermined range is at least partially non-overlapping with the first predetermined range.

10

24. The device of Claim 23 wherein the user interface is configured to provide a second output from the signal processing unit indicative of whether the at least one test measure is within the second predetermined range.

15

25. The device of Claim 20 wherein the test signal has a frequency within a predetermined range of a resonant frequency of the actuator.

20

26. The device of Claim 20 wherein the signal generator is configured to provide a plurality of predetermined test signals for use in generating a corresponding plurality of electrical signals passing through the actuator, wherein the plurality of predetermined test signals include a corresponding plurality of different frequencies distributed across a predetermined frequency range.

27. The device of Claim 26 wherein the measurement device is configured to measure a plurality of magnetic field measures corresponding to the plurality of electrical signals passing through the actuator.
- 5 28. The device of Claim 22 wherein the first performance parameter indicates if the hearing aid is operational.

10 29. The device of Claim 22 wherein the first performance parameter indicates a position of the measurement device relative to the implanted transducer.

15 30. The device of Claim 24 wherein the second performance parameter indicates a status of an interface between the actuator and a component of the auditory system of the patient.

20 31. The device of Claim 20 wherein the signal generator comprises:
an oscillator for generating the test signal;
a test control processor to set the oscillator to generate the test signal;
and
a reference transmitter to provide the test signal to the actuator.

32. The device of Claim 20 wherein the measurement device comprises:

a pair of coils for measuring the magnetic field generated by the actuator.

5 33. The device of Claim 20 wherein the actuator comprises:

an electrodynamic transducer that includes a vibratory member to stimulate the component of the auditory system.